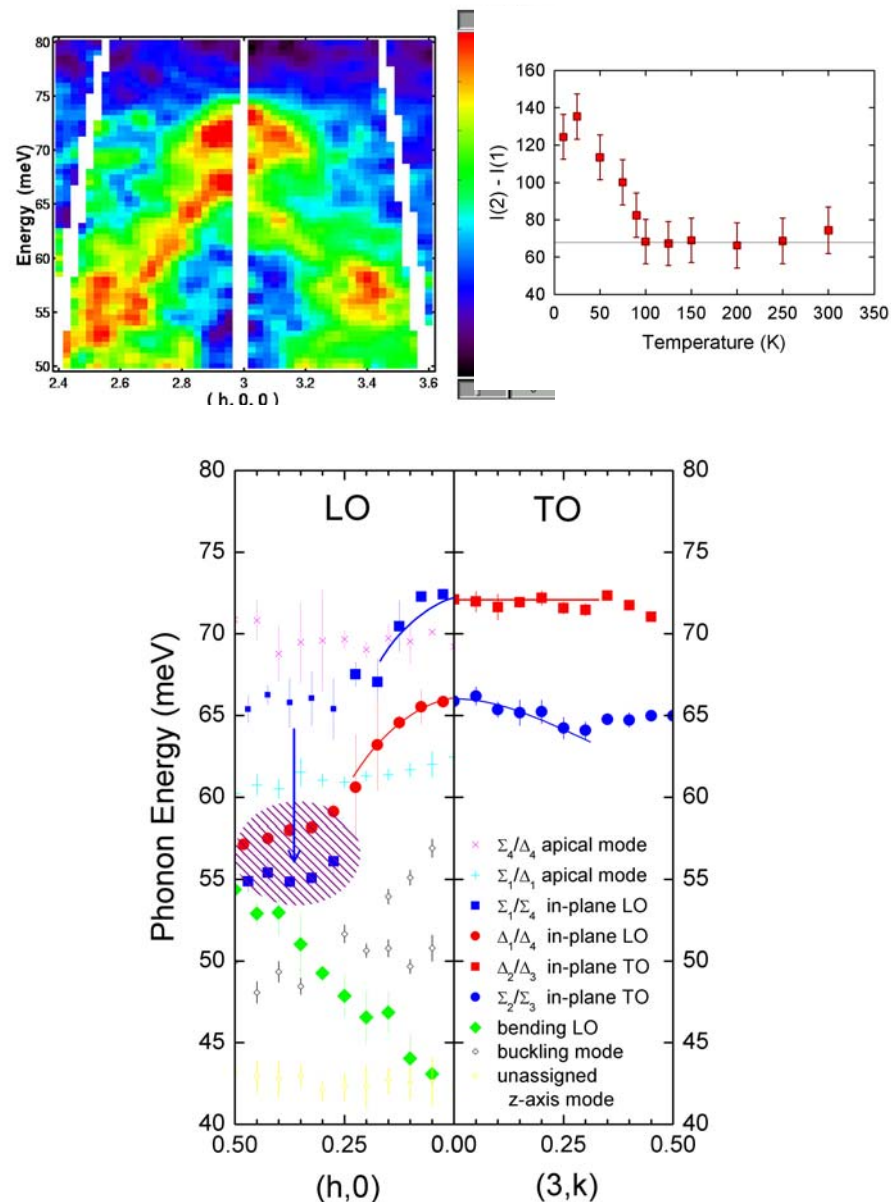


Local Structure of Complex Oxides

Takeshi Egami, Univ. of Tennessee, DMR01-02565

While the majority in the field of high-temperature superconductivity believed that the lattice vibration (phonons) has nothing to do with superconductivity, we found evidence that they may not be totally correct. Our phonon measurement by pulsed neutron inelastic scattering performed with the MAPS of the ISIS shows certain phonons are closely coupled to the superconductive order parameter.

The scattering intensity (above, left), temperature dependence of scattering intensity at $h = 3.25$ (above, right) and the phonon dispersion (below). For details see Chung, et al., *Phys. Rev. B* **67**, 014517 (2003).

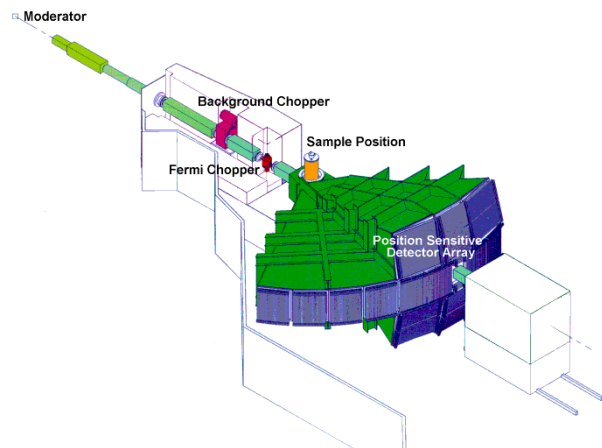


Local Structure of Complex Oxides

Takeshi Egami, Univ. of Tennessee, DMR01-02565

Education:

Two graduate students (Jae-Ho Chung and Ferenc Stercel) are the main contributors of this work. They traveled often and far (to the ISIS facility near Oxford, UK) to collect the data, and worked hard to extract information from a vast amount of data (250MB per data set). Chung received his Ph.D. degree in September from the University of Pennsylvania.



MAPS at the
ISIS (UK)

Outreach:

The PI upgraded the pulsed neutron diffractometer (now called NPDF) at the Los Alamos National Laboratory with the funding from the NSF (DMR00-76488) to achieve the highest resolution in pair-density function (PDF) analysis and made available to public.



The last stage of NPDF assembly. A technician is installing neutron detectors.